REMARKS

In response to the objection to Figure 8, Applicants submit herewith proposed drawing corrections (with changes marked in red ink), where the block elements have been labeled with reference numbers. Corresponding changes have been made to page 21 of the specification.

Applicants will submit corrected formal drawings upon approval by the Examiner.

Claims 2 and 3 were rejected under 35 U.S.C. § 112, second paragraph. In claim 2, the Examiner considered the phrase "the reference value measured" to be indefinite in that there is no reference value being measured. As to claim 3, the Examiner considered the phrase "the integration value" to lack antecedent basis.

In response, claim 2 has been amended to more clearly recite that the claimed method comprises measuring a point in time when the reception waiver the full-waive-rectified wave has reached the reference value [measured as] to thereby determine an arrival time in the propagation time measurement step. Claim 3 has been amended to replace "integration" with "integral".

It is respectfully submitted that the claims as amended fully comply with 35 U.S.C. § 112, and withdrawal of the foregoing rejection is respectfully requested.

Claims 1-3 were rejected under 35 U.S.C. § 102(b) as being anticipated by either U.S. Patent 4,515,021 to Wallace et al or JP 9-318644 (JP '644). The Examiner considered both Wallace et al and JP '644 as meeting the terms of the rejected claims, citing Fig. 3, col. 6, line 41 to col. 8, line 36 of Wallace et al and Fig. 5 of JP '644.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the following remarks.

A characteristic feature of the present invention resides in setting a reference value based on an integral value of the full-wave-rectified wave, and then determining an arrival time of the reception wave based on the thus obtained reference value. That is, rather than setting a predetermined reference value against which arrival time of the reception wave is measured, the reference value changes based on gas concentration and measurement conditions.

Namely, as discussed at pages 3-4 of the specification, ultrasonic reception waves can attenuate due to the surrounding atmosphere. In such a case, when a fixed reference value is used as in a conventional technique, the time which a reception wave or full-wave-rectified wave requires to reach a fixed value increases, resulting in inaccurate measurement of propagation time. Therefore, in the present invention, the reference value is adjustably set based on the strength of the reception signal. Thus, as the reception wave attenuates, the reference value (which is set on the basis of the reception wave or a full-wave-rectified wave obtained therefrom) also decreases.

More particularly, in the present invention, the reference value itself is adjusted in consideration of pressure and other factors which influence propagation time. Therefore, even when a reception wave is attenuated due to pressure or other cause during actual measurement, accurate measurement is affected at all times.

Turning to the cited prior art, Wallace et al represents a conventional technique using a fixed reference value. See col. 6, lines 47-49 (a comparison circuit 26 compares the output 28 of

rectified reception wave from integrator 24 is compared to a preset reference voltage determined by potentiometer 88 connected between a reference voltage V^+ and ground. That is, Wallace et al does not meet "setting a reference value on the basis of the integral value" as required by present claim 1.

From the English Abstract of JP '644, and in reference to Fig. 5 cited by the Examiner, the integrated output from integrator 8 is compared with a reference voltage from reference voltage generating circuit 10 by comparator 9. The reference voltage is set to a middle value where the integrated output arises synchronously with the rise of the halfway of the second wave. In other words, similar to Wallace et al, integrator output 8 is compared to a preset reference value which does not change to accommodate attenuation of the reception wave. Thus, like Wallace et al, JP '644 also does not meet the terms of claim 1 which requires setting a reference value on the basis of the integral value.

Withdrawal of the foregoing rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claims 4-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over either Wallace et al or JP '644 in view of U.S. Patent 6,418,782 to Sato et al. The Examiner relied on Sato et al as disclosing a gas concentration sensor for measuring gas concentration within an intake pipe or canister purge line of an internal combustion engine.

Applicants rely on the response above with respect to the rejection over Wallace et al or JP '644 alone.

Withdrawal of all rejections and allowance of claims 1-9 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution

of this application, the Examiner is invited to contact the undersigned at the local Washington,

D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue

Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any

overpayments to said Deposit Account.

Respectfully submitted,

Abraham J. Rosner
Registration No. 33,276

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: December 2, 2003

Fig. 8
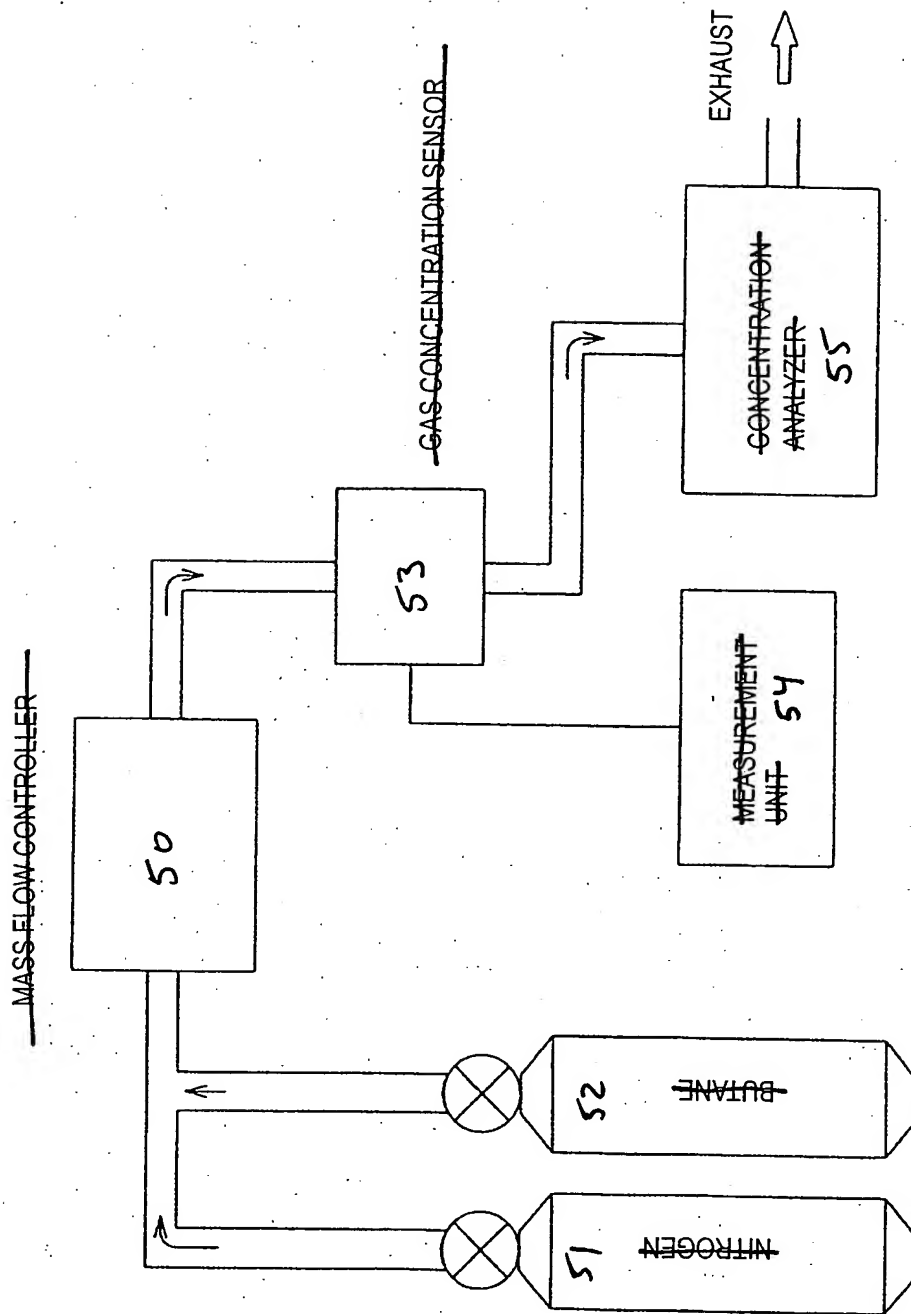

MASS FLOW CONTROLLER

GAS CONCENTRATION SENSOR

50

53

54   MEASUREMENT UNIT

55   CONCENTRATION ANALYZER

EXHAUST

52   BUTANE

51   NITROGEN

Fig.8